Marathon Oil – Various Well Sites
Partial Compliance Evaluation (PCE)
On-Site Clean Air Act (CAA) Inspections

Inspection Date:	June 18-19, 2018
Inspection Report Date:	December 7, 2018
EPA Representatives:	Bob Gallagher – EPA Region 8 Bill Squier – EPA NEIC Doreen Au – EPA NEIC
Tribal Representatives:	Bird Lockwood – MHA Energy Joseph Davis – MHA Energy
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Inspection Report Prepared By:	Bob Gallagher
Inspection Report Reviewed By:	Scott Patefield
Applicable Rules:	Fort Berthold Indian Reservation (Mandan, Hidatsa and Arikara Nation), North Dakota (Fort Berthold FIP)

Observations

The EPA and MHA Energy inspected numerous Marathon Oil (Marathon) well sites/pads and attempted to detect natural gas emissions using infrared (IR) cameras and the Geospatial Measurement of Air Pollutants (GMAP) mobile unit. The inspections were conducted at locations with new wells, at facilities with previously noted emissions, and in specific areas on the Fort Berthold Indian Reservation. See Appendix A for more location details.

Appendix A also includes a table with inspection details for each site visited and the wells associated with each pad.

Bird Lockwood and/or Joseph Davis of MHA Energy accompanied EPA staff onsite at the locations for inspections on June 18 and 19, 2018. EPA staff used a FLIR IR camera as well as the GMAP mobile monitoring to determine emissions and measure concentrations of methane (CH_4), benzene, and toluene. MHA Energy staff used an Opgal IR camera to detect emissions at the well pad sites.

Inspection Information

EPA inspectors scanned well sites located on the Fort Berthold Indian Reservation (FBIR) for detectable emissions using an IR camera and using the GMAP. Specifically, EPA and MHA Energy inspectors

scanned for detectable emissions from crude and/or water storage tanks, generators, flares, and piping at the well pads. EPA focused on newly constructed wells where emissions are more likely to be observed. Additionally, at the FBIR sites, EPA observed flares with the IR camera to determine if the flares appeared to be in compliance with Fort Berthold FIP applicable requirements. Please be advised that this inspection report is finalized, but that the report is not a final determination of compliance.

Fort Berthold FIP Applicability

Based on drilling information reported to the NDIC well index by Marathon, the well sites listed in Appendix A were completed after the August 12, 2007 applicability date (per 40 C.F.R. § 49.4161) and are producing from the Bakken Pool (per 40 C.F.R. § 49.4163(a)(1)) and are thus subject to the Fort Berthold FIP (See Table 1).

Closed Vent System Equipment Requirements [§49.4165(b)(1)]

"Each closed-vent system must route all produced natural gas and natural gas emissions from production and storage operations to the natural gas sales pipeline or the control devices…". The EPA, using an IR camera, inspected each facility to ensure all emissions are being routed from the storage tanks to the emissions control device. As an area of concern, the IR camera detected emissions from tanks on the Myrimidon, Shoots USA, Meyers, and Aisenbrey pads.

Closed Vent System Equipment Requirements [§49.4165(b)(3)]

"Each closed-vent system must be designed to operate with no detectable natural gas emissions." The EPA, using an IR camera, inspected each closed-vent system to ensure that there were no detectable emissions. As an area of concern, the GMAP mobile monitors detected emissions of methane on the Shoots USA, Mamie USA, Hunts Along USA, Demaray USA, Winona USA, and Reno USA pads. As an area of concern, the GMAP mobile monitors detected emissions of benzene on the Mark USA and Winona USA pads. As an area of concern, the GMAP mobile monitors detected emissions of toluene on the Mark USA pad.

Utility Flares [§49.4165(c)(6)(i)]

"The owner or operator must ensure that each enclosed combustor and utility flare is: (i) Operated properly at all times that produced natural gas and/or natural gas emissions are routed to it." EPA looked at each utility flare for any indication that the utility flare was not being operated properly. As an area of concern, the IR camera detected an unlit flare on the Skold pad.

Utility Flares [§49.4165(6)(vii)]

"The owner or operator must ensure that each enclosed combustor and utility flare is: (vii) Operated with no visible smoke emissions." EPA looked at each utility flare for any indication of visible smoke emissions. As an area of concern, there was a smoking flare on the Aisenbrey pad.

Areas of Concern

The following areas of concern were noted:

- The IR camera detected emissions from tanks on the Myrimidon, Shoots USA, Meyers, and Aisenbrey pads.
- The GMAP mobile monitors detected emissions of methane on the Shoots USA, Mamie USA, Hunts Along USA, Demaray USA, Winona USA, and Reno USA pads.
- The GMAP mobile monitors detected emissions of benzene on the Mark USA and Winona USA pads.
- The GMAP mobile monitors detected emissions of toluene on the Mark USA pad.

- The IR camera detected an unlit flare on the Skold pad.
- There was a smoking flare on the Aisenbrey pad.
- Also, leaking portable generators were noted on the Winona USA pad.

Table 1 - Requirements Applicable to Inspection Observations

Regulation	Requirement Type	Regulatory Text
Fort Berthold FIP	Control Equipment Requirements – Covers	§49.4165(a): (a) Covers. Each owner or operator must equip all openings on each produced oil storage tank and produced water storage tank interconnected with produced oil storage tanks with a cover to ensure that all natural gas emissions are efficiently being routed through a closed-vent system to a vapor recovery system, an enclosed combustor, a utility flare, or a pit flare. (1) Each cover and all openings on the cover (e.g., access hatches, sampling ports, pressure relief valves (PRV), and gauge wells) shall form a continuous impermeable barrier over the entire surface area of the produced oil and produced water in the storage tank. (2) Each cover opening shall be secured in a closed, sealed position (e.g., covered by a gasketed lid or cap) whenever material is in the unit on which the cover is installed except during those times when it is necessary to use an opening as follows: (i) To add material to, or remove material from the unit (this includes openings necessary to equalize or balance the internal pressure of the unit following changes in the level of the material in the unit); (ii) To inspect or sample the material in the unit; or (iii) To inspect, maintain, repair, or replace equipment located inside the unit. (3) Each thief hatch cover shall be weighted and properly seated. (4) Each PRV shall be set to release at a pressure that will ensure that natural gas emissions are routed through the closed-vent system to the vapor recovery system, the enclosed combustor, or the utility flare under normal operating conditions.
Fort Berthold FIP	Control Equipment Requirements – Closed-vent systems	(b) Closed-vent systems. Each owner or operator must meet the following requirements for closed-vent systems: (1) Each closed-vent system must route all produced natural gas and natural gas emissions from production and storage operations to the natural gas sales pipeline or the control devices required by paragraph (a) of this section. (2) All vent lines, connections, fittings, valves, relief valves, or any other appurtenance employed to contain and collect natural gas, vapor, and fumes and transport them to a natural gas sales pipeline and any VOC control equipment must be maintained and operated properly at all times. (3) Each closed-vent system must be designed to operate with no detectable natural gas emissions. (4) If any closed-vent system contains one or more bypass devices, except as provided for in paragraph (b)(4)(iii) of this section, that could be used to divert all or a portion of the natural gas emissions, from entering a natural gas sales pipeline and/or any control devices, the owner or operator must meet the one of following requirements for each bypass device: (i) At the inlet to the bypass device that could divert the natural gas emissions away from a natural gas sales pipeline or a control device and into the atmosphere, properly install, calibrate, maintain, and operate a natural gas flow indicator that is capable of taking continuous readings and sounding an alarm when the bypass device is open such that natural gas emissions are being, or could be, diverted away from a natural gas sales pipeline or a control device and into the atmosphere;

Table 1 - Requirements Applicable to Inspection Observations		
Regulation	**Requirement Type**	**Regulatory Text**
		(ii) Secure the bypass device valve installed at the inlet to the bypass device in the non-diverting position using a car-seal or a lock-and-key type configuration; (iii) Low leg drains, high point bleeds, analyzer vents, open-ended valves or lines, and safety devices are not subject to the requirements applicable to bypass devices.
Fort Berthold FIP	Control Equipment Requirements – Enclosed combustors and utility flares	(c) Enclosed combustors and utility flares. Each owner or operator must meet the following requirements for enclosed combustors and utility flares: (1) For each enclosed combustor or utility flare, the owner or operator must follow the manufacturer's written operating instructions, procedures and maintenance schedule to ensure good air pollution control practices for minimizing emissions; (2) For each enclosed combustor or utility flare, the owner or operator must ensure there is sufficient capacity to reduce the mass content of VOC in the produced natural gas and natural gas emissions routed to it by at least 98.0 percent for the minimum and maximum natural gas volumetric flow rate and BTU content routed to the device; (3) Each enclosed combustor or utility flare must be operated to reduce the mass content of VOC in the produced natural gas and natural gas emissions routed to it by at least 98.0 percent; (4) The owner or operator must ensure that each utility flare is designed and operated in accordance with the requirements of 40 CFR 60.18(b) for such flares, except for §60.18(c)(2) and (f)(2) for those utility flares operated with an electronically controlled automatic igniter. (5) The owner or operator must ensure that each enclosed combustor is: (i) A model demonstrated by a manufacturer to the meet the VOC destruction efficiency requirements of §§49.4161 through 49.4168 using the procedure specified in 40 CFR part 60, subpart OOOO at §60.5413(d) by the due date of the first annual report as specified in §49.4168(b); or (ii) Demonstrated to meet the VOC destruction efficiency requirements of §§49.4161 through 49.4168 using EPA approved performance test methods specified in 40 CFR part 60, subpart OOOO at §60.5413(b) by the due date of the first annual report as specified in §49.4168(b). (6) The owner or operator must ensure that each enclosed combustor and utility flare is: (i) Operated properly at all times that produced natural gas and/or natural gas emissions are routed to it; (ii) Operated with a liquid knock-out system to collect any condensable vapors (to prevent liquids from going through the control device); (iii) Equipped with a flash-back flame arrestor; (iv) Equipped with one of the following: (A) A continuous burning pilot flame. (B) An electronically controlled automatic igniter; (v) Equipped with a monitoring system for continuous recording of the parameters that indicate proper operation of each enclosed combustor, utility flare, continuous burning pilot flame, and electronically controlled automatic igniter, such as a chart recorder, data logger or similar devices;

Table 1 - Requirements Applicable to Inspection Observations		
Regulation	**Requirement Type**	**Regulatory Text**
		(vi) Maintained in a leak-free condition; and (vii) Operated with no visible smoke emissions.
Fort Berthold FIP	Control Equipment Requirements – Pit flares	(d) Pit Flares. Each owner or operator must meet the following requirements for pit flares: (1) The owner or operator must develop written operating instructions, operating procedures and maintenance schedules to ensure good air pollution control practices for minimizing emissions from the pit flare based on the site-specific design. (2) The owner or operator must only use a pit flare for the following operations: (i) To control produced natural gas and natural gas emissions during well completion operations or recompletion operations; (ii) To control produced natural gas and natural gas emissions in the event that natural gas recovered for pipeline injection must be diverted to a backup control device because injection is temporarily infeasible and there is no operational enclosed combustor or utility flare at the oil and natural gas production facility. Use of the pit flare for this situation is limited to a maximum of 500 hours in any twelve (12) consecutive months; or (iii) Control of standing, working, breathing, and flashing losses from the produced oil storage tanks and any produced water storage tank interconnected with the produced oil storage tanks if the uncontrolled potential VOC emissions from the aggregate of all produced oil storage tanks and produced water storage tanks interconnected with produced oil storage tanks is less than, and reasonably expected to remain below, 20 tons in any consecutive 12-month period. (3) The owner or operator must only use the pit flare under the following conditions and limitations: (i) The pit flare is operated to reduce the mass content of VOC in the produced natural gas and natural gas emissions routed to it by at least 90.0 percent; (ii) The pit flare is operated in accordance with the site-specific written operating instructions, operating procedures, and maintenance schedules to ensure good air pollution control practices for minimizing emissions; (iii) The pit flare is operated with no visible smoke emissions; (iv) The pit flare is equipped with an electronically controlled automatic igniter; (v) The pit flare is visually inspected for the presence of a flame anytime produced natural gas or natural gas emissions are being routed to it. Should the flame fail, the flame must be relit as soon as safely possible and the electronically controlled automatic igniter must be repaired or replaced before the pit flare is utilized again; and (vi) The owner or operator does not deposit or cause to be deposited into a flare pit any oil field fluids or oil and natural gas wastes other than those designed to go to the pit flare.
Fort Berthold FIP	Control Equipment Requirements –	(e) Other Control Devices. Upon prior written approval by the EPA, the owner or operator may use control devices other than those listed above that are determined by EPA to be capable of reducing the mass content of VOC in the natural gas routed to it by at least 98.0 percent, provided that:

Table 1 - Requirements Applicable to Inspection Observations		
Regulation	**Requirement Type**	**Regulatory Text**
	Other Control Devices	(1) In operating such control devices, the owner or operator must follow the manufacturer's written operating instructions, procedures and maintenance schedule to ensure good air pollution control practices for minimizing emissions; and (2) The owner or operator must ensure there is sufficient capacity to reduce the mass content of VOC in the produced natural gas and natural gas emissions routed to such other control devices by at least 98.0 percent for the minimum and maximum natural gas volumetric flow rate and BTU content routed to each device. (3) The owner or operator must operate such a control device to reduce the mass content of VOC in the produced natural gas and natural gas emissions routed to it by at least 98.0 percent.

APPENDIX A: Inspection Details

Date	Wellpad Permit No	Current Well Name	PCE/FCE	IR Camera Footage Taken File #	GMAP File	Emissions Measured by GMAP
6/18/2018	17008	MYRMIDON 1-2H	PCE (Did not assess engines)	MOV_0100	180618-MA12	
	33491	SHOOTS USA 41-2H		MOV_0101	180618-MA13	CH4 = 7.1 ppm
	33492	MAMIE USA 21-1TFH		MOV_0102	180618-MA14	CH4 = 11.6 ppm
	18471	HUNTS ALONG USA 12-1H		MOV_0103	180618-MA15	CH4 = 10.8 ppm
	32865	DEMARAY USA 41-2TFH		MOV_0104	180618-MA16	CH4 = 20.8 ppm
	33493	MARK USA 11-1H			180618-MA17	Tolu = 333 ppb Benz = 449 ppb
	33494	TIMOTHY USA 11-1TFH-2B			180618-MA18	
	33412	WINONA USA 21-2TFH-2B		MOV_0105	180618-MA19	CH4 = 130 ppm Benz = 126 ppb
	33413	CHAUNCEY USA 31-2H		MOV_0106		
	33414	WILBUR USA 31-2TFH		MOV_0107		
	33415	JUNE USA 31-2H		MOV_0108		
	33416	MILES USA 41-2TFH-2B				
6/19/2018	22113	BAKER USA 11-18TFH & 11-18H	PCE (Did not assess engines)		180619-MA05	
	33431	BIRDS BILL USA 41-2TFH			180619-MA05	
	33664	BEARS ARM USA 41-2H				
	33430	BIG HEAD USA 41-2TFH				
	33347	HOUSER 14-36H				
	33346	HARLEY 14-36TFH				
	33345	LUND 44-35H				
	31400	STARK 44-35TFH				
	26461	SKOLD 34-35TFH		MOV_0115		
	26462	MYERS 24-35H		MOV_0116	180619-MA05	
	26463	REED 24-35TFH				
	26464	KIMBALL 14-35TFH				
	18243	GLADYS USA 21-2H				
	22446	AISENBREY 21-25TFH		MOV_0117	180619-MA06	
	21112	AISENBREY 21-25H		MOV_0118	180619-MA06	
	29596	PALMER 31-25TFH		MOV_0119	180619-MA06	
6/19/2018	32524	RENO USA 24-9TFH-2B	PCE (Did not assess engines)	MOV_0133	180619-MA10	CH4 = 4.3 ppm
	32525	KERMIT USA 14-9H		MOV_0134		
	32526	ARDEN USA 14-9TFH		MOV_0135		
	33281	IRON WOMAN USA 14-9H		MOV_0136		

APPENDIX B: IR Log

COMPANY/ OPERATOR	SITE	FILE DATE	File #.Format	PHOTO GRAPHER	DISTANCE (yds) Camera to Leak	DESCRIPTION
Marathon	MYRMIDON 1-2H	6/18/2018	MOV_0100.mp4	D. Au	Not reported	Tank venting, tank loading thief hatch on one
Marathon	SHOOTS USA 41-2H	6/18/2018	MOV_0101.mp4	D. Au	Not reported	Tank venting, tank loading thief hatch on one
Marathon	MAMIE USA 21-1TFH	6/18/2018	MOV_0102.mp4	D. Au	Not reported	Overall plant including white hot flares
Marathon	HUNTS ALONG USA 12-1H	6/18/2018	MOV_0103.mp4	D. Au	Not reported	tanks from driveway
Marathon	DEMARAY USA 41-2TFH	6/18/2018	MOV_0104.mp4	D. Au	Not reported	tanks from driveway after thief hatch closed after truck loading
Marathon	WINONA USA 21-2TFH-2B	6/18/2018	MOV_0105.mp4	D. Au	Not reported	Leaking portable generators running on field gas
Marathon	CHAUNCEY USA 31-2H	6/18/2018	MOV_0106.mp4	D. Au	Not reported	Tank battery
Marathon	JUNE USA 31-2H	6/18/2018	MOV_0108.mp4	D. Au	Not reported	Overview of site from driveway tanks to flares
Marathon	SKOLD 34-35TFH	6/19/2018	MOV_0115.mp4	D. Au	Not reported	Flare not lit, venting
Marathon	MYERS 24-35H	6/19/2018	MOV_0116.mp4	D. Au	Not reported	At Reed CTB on same footprint, leaking tank
Marathon	AISENBREY 21-25TFH	6/19/2018	MOV_0117.mp4	D. Au	Not reported	Produced water tanks venting, not numbered
Marathon	AISENBREY 21-25H	6/19/2018	MOV_0118.mp4	D. Au	Not reported	Smoking flare
Marathon	PALMER 31-25TFH	6/19/2018	MOV_0119.mp4	D. Au	Not reported	Crude oil, hsm intermittent venting
Marathon	RENO USA 24-9TFH-2B	6/19/2018	MOV_0133.mp4	D. Au	Not reported	Produced water tank
Marathon	KERMIT USA 14-9H	6/19/2018	MOV_0134.mp4	D. Au	Not reported	Produced water tanks
Marathon	ARDEN USA 14-9TFH	6/19/2018	MOV_0135.mp4	D. Au	Not reported	Flare
Marathon	IRON WOMAN USA 14-9H	6/19/2018	MOV_0136.mp4	D. Au	Not reported	Flare